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ber of the group was recognized to be typically folioliferous. Specimens have been examined from Massachusetts collected by Miss Carr and Mr. Walter Gerritson. It has also been collected on Mt. Washington.

C. verticillata evoluta f. *apoticta* (Ach.) Wainio. A very curious form collected by Miss C. M. Carr, on sterile soil, Sudbury, Mass., is referred here.

C. verticillata m. *cervicornis* (Ach.) Flk. Examination of numerous European examples emphasize the fact that the caespitose macrophylline primary thallus is the only really distinctive character. Typically inconstant in all other of its exprsssions the Europeans have applied a host of definative phrases to the varying conditions. Such American material as we have seen is referable to Floerk's f. *phyllophora* (De Clad. p. 28) and Nylander's f. *polycarpoides* (Li. Par p. 30.) the former received from Prof. Macoun collected at Mt. Murray, Quebec, and the latter from Miss Carr, collected in Sudbury. Of Miss Carr's plant we can only provisionally place it. European specimens of f. *polycarpoides* are provided with a conspicuous primary thallus, in the Sudbury plant the thallus is deficient. Nylander unites the form with his v. *cervicornis*, but our specimen seems more an expression of v. *evoluta*. It is true that in the obliteration of the scyphi by dissection into fastigiate branchlets there is a strong point of resemblance to cervicornis but ours occurred unmixed with V. evoluta, and may be but a modification.

C. verticillata m. *abbreviata* Wainio, constituted on material collected by Henry Willey in New Bedford, Mass., seems on the whole to be but an expression of m. *cervicornis*. Reduced in both thallus and podetia the state is probably the result of aridity of habitat. Examination of a French specimen detetmined by Wainio discloses many points of similarity with m. *cervicornis*, the most conspicuous of which was the congested horizontal thallus. We have recently found the plant in our own region.

Rockland, Maine.

A NOTE ON LOCAL MOSS DISTRIBUTION.

JOHN M. HOLZINGER.

The mode of occurrence of several mosses characteristic of the vicinity of Winona, Minn., on the bluffs facing the upper Mississippi valley, appears to follow a very definite law of distribution on a small scale. This fact did not become clear to the writer till this summer, when an opportunity was afforded of a somewhat close exploration for mosses of the bluffs around Dakota, a village on the banks of the "Great Father of Waters," some twenty miles below Winona. Briefly stated, the characteristic mosses near river level (820 feet above the Gulf of Mexico) are *Barbula obtusifolius*, *Bryum pendulum* and *Leptobryum pryiforme*, all occurrring in great abundance on perpendicular sand ledges kept moist more or less throughout the year, and lying in the shade, The Chicago, Milwaukee and St. Paul Railroad here skirts the west bank of the river from La Crosse to St. Paul. Its bed runs just above high water mark. In many places it is hewn out of the solid sand rock. The perpendicular ledges thus exposed are much of the day in the shade, and wherever water trickles from above they become covered with an interesting and uniform moss vegetation, the species mentioned being the most characteristic. Another companion forming extensive dense mats and fruiting abundantly, is *Gymnostomum curvirostre*, but this and the *Bryum* seem able to stand a somewhat drier situation, for depauperate forms of both occur also higher up on the bluffs.

In striking contrast with this river level flora is that at the top of the bluffs, only four hundred feet higher. The most abundant and most characteristic moss here is *Grimmia teretinervis*, covering the calcareous sunburnt sand rock, exposed to an all day sun, in black flat cushions, which are hardly recognized as plants by young students. This species is always sterile. On the same level occur also, with the same regularity, only less abundantly, *Coscinodon Raui* and *C. Wrightii*, both fruiting. Their principal companions are *Tortula ruralis*, *Tortella fragilis* and *Ditrichum flexicaule brevifolium*. all sterile.

We have thus on a small scale a real arid region moss flora at the tops of our Mississippi bluffs enjoying essentially the conditions prevailing in dry countries. While at the base, near the river level, there thrives another uniform flora characteristic of better watered regions. And the interesting part is the fact that this narrow strip in altitude extends for fully a hundred miles or more along our Great River.

This peculiar parallelism is made possible by the geological formation, the several alternating strata of Lower Silurian lime and sand rock lie in the Upper Mississippi Basin nearly as horizontal as when they were laid down millions of years ago, so that the Great River with its tributaries large and small, has made its valley by erosion through these strata establishing identical conditions at the two levels referred to. Winona, Minn.

DIE EUROPAEISCHEN LAUBMOOSE.

By G. Roth, Leipzig, Verlag von Wilhelm Engelmann.

JOHN M. HOLZINGER.

This bryological work comprises two 8vo. volumes of considerable size and appeared in parts in rather rapid succession since early in 1904. The first volume comprises the Cleistocarpi and Acrocarpi to Bryaceae, and covers five hundred and ninety-eight pages of printed matter, exclusive of thirteen pages of Table of Contents, and fifty-two plates closely crowded with drawings of microscopic details of the species described. The second volume, completed in 1905, concludes the Acrocarpi and completes the Pleurocarpi, covering seven hundred and thirty-three pages, accompanied by sixty-two plates similarly replete with figures. The descriptions are accurately drawn up and go into details after the fashion of Limpricht, supplementing in a very helpful way the short and often too incomplete descriptions of many older species. Great care is taken to record the substratum, mode of occurrence and the distribution of the species treated. The legend for the